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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER				
FUJITA, KATRINA R				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/521,254

**Applicant(s)**

KAUS ET AL.

**Examiner**

KATRINA FUJITA

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see page 16, line 13, filed December 16, 2008, with respect to the rejection(s) of claim(s) 1-9 under 35 U.S.C. § 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art references.

### ***Information Disclosure Statement***

2. The Pardo et al. reference cited in the Search Report EPO has not been considered, and will not be listed on any patent resulting from this application because it was not provided on a separate list in compliance with 37 CFR 1.98(a)(1). In order to have the reference printed on such resulting patent, a separate listing, preferably on a PTO/SB/08A and 08B form, must be filed within the set period for reply to this Office action.

***Claim Objections***

3. The previous claim objections are withdrawn in light of Applicant's amendment after the previous Final Office Action.

***35 USC § 101***

4. The method of claim 1 requires adapting a "deformable surface model" to an object and extracting geometrical properties of the structure of the object. The claimed adapting is performed by a computer in that only a computer can execute the computationally complex processing of the "deformable surface model" and realize the intended purpose of the invention. A reasonable interpretation of the specification indicates that this step, in addition to the other recited steps, require a programmed computer in order to accomplish the intended purpose of the invention, and there is NO disclosed indication of manual and/or mental activity involved. Therefore, claim 1 is tied to a machine and thus a statutory process.

5. The method of claim 5 requires determining a "deformable surface model" of an object. The claimed determining is performed by a computer in that only a computer can execute the computationally complex processing of the "deformable surface model" and realize the intended purpose of the invention. A reasonable interpretation of the specification indicates that this step, in addition to the other recited steps, require a

programmed computer in order to accomplish the intended purpose of the invention, and there is NO disclosed indication of manual and/or mental activity involved. Therefore, claim 5 is tied to a machine and thus a statutory process.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu ("Computing parametric geon descriptions of 3d multi-part objects", Thesis).

Regarding **claim 5**, Wu discloses a method for determining an extended deformable surface model for adaptation to an object ("finite element model in the form of a closed triangular mesh is created over the object surface" at page 42, line 7), comprising the steps of:

determining a deformable surface model of the object, wherein the deformable surface model describes a surface of the object ("sphere is deformed towards the shape of the object and residuals between the model and data points are computed" at page 56, line 10; figure 4.9); and

integrating additional geometrical information into the deformable surface model ("parametric geon models are fitted to an object part" at page 61, line 8).

Regarding **claim 6**, Wu discloses a method wherein the step of integrating additional geometrical information into the deformable surface model further comprises the steps of:

selecting surface elements of a plurality of surface elements of the deformable surface model which belong to a sub-part of the object ("triangulated object surface is decomposed into several parts" at page 42, line 12);

labeling the surface elements of the plurality of surface elements of the deformable surface model such that surface elements which belong to the same sub-part have the same label ("triangles belonging to the same physical part are obtained by a connected component labelling process" at page 42, line 12).

Regarding **claim 7**, Wu discloses a method wherein the step of integrating additional geometrical information into the deformable surface model further comprises the steps of:

selecting a geometrical primitive in accordance with a form of the sub-part ("All parametric geon models are fitted to an object part" at page 61, line 8; "best model for that part is selected" at page 61, line 9); and

determining a rule which maps the geometrical primitive onto the surface elements of the plurality of surface elements of the deformable surface model ("All parametric geon models are fitted to an object part by minimising a function of the difference between the shape and size of a part and the models" at page 61, line 9).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-4, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Wu and Holten-Lund et al. ("VRML Visualization...", ACM Article).

Regarding **claim 1**, Wu discloses a method for determining geometrical properties of a structure of an object displayed in an image ("three-dimensional (3D) shape representation of objects based on parts" at page 1, last paragraph, line 1) comprising the steps of:

adapting a deformable surface model to the object ("sphere is deformed towards the shape of the object and residuals between the model and data points are computed" at page 56, line 10; figure 4.9);

applying additional geometrical information to the adapted deformable surface model of the object ("parametric geon models are fitted to an object part" at page 61, line 8).

Wu does not disclose extracting the geometric properties of the structure of the object from the adapted deformable surface model to which additional geometrical information has been applied.

Holten-Lund et al. teaches a method for determining geometrical properties of a structure of an object displayed in an image ("make the necessary measurements of the deformation" at section 1, paragraph 4, line 1), comprising:

extracting the geometric properties of the structure of the object ("measure the topology" at section 3, paragraph 2, line 5; figure 9, "Furthermore results of a measurement are shown" at window labeled "Angle-ent6") from the adapted deformable surface model ("iso-surface" at section 3, paragraph 2, line 1, which is generated from VRML, implying that it is deformable by changing the specifications of the model parameters, i.e. vertices, edges, texture, etc.) to which additional geometrical information has been applied ("approximate primitives" at section 3, paragraph 2, line 4; figure 9, spherical primitive).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the measurements of Holten-Lund et al. on the adapted models of Wu such that further understanding of object parts may be obtained by providing a quantification of the data, in addition to allowing the Wu method to have a particular applicability to the field of medical imaging (see Holten-Lund et al. at section 1, paragraphs 3 and 4).

Regarding **claim 8**, Wu discloses an image processing device ("SPARC-10 or SGI R4000 or R8000 workstations" at page 81, line 7), comprising:



a memory (memory of workstation) for storing a deformable model (figure 4.9) and an image depicting an object (figure 4.7); and

an image processor (processor of workstation) for determining geometrical properties of the object ("three-dimensional (3D) shape representation of objects based on parts" at page 1, last paragraph, line 1), which processor performs the following operation:

adapting a deformable surface model to the object ("sphere is deformed towards the shape of the object and residuals between the model and data points are computed" at page 56, line 10; figure 4.9);

applying additional geometrical information to the adapted deformable surface model of the object ("parametric geon models are fitted to an object part" at page 61, line 8).

Wu does not disclose extracting the geometric properties of the structure of the object from the adapted deformable surface model to which additional geometrical information has been applied.

Holten-Lund et al. teaches an image processing device, comprising:

a processor (processor of PC, implied by section 3.2) for determining geometrical properties of the object ("make the necessary measurements of the deformation" at section 1, paragraph 4, line 1), which processor performs the following:

extracting the geometric properties of the structure of the object ("measure the topology" at section 3, paragraph 2, line 5; figure 9, "Furthermore results of a measurement are shown" at window labeled "Angle-ent6") from the adapted deformable

surface model ("iso-surface" at section 3, paragraph 2, line 1, which is generated from VRML, implying that it is deformable by changing the specifications of the model parameters, i.e. vertices, edges, texture, etc.) to which additional geometrical information has been applied ("approximate primitives" at section 3, paragraph 2, line 4; figure 9, spherical primitive).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the measurements of Holten-Lund et al. on the adapted models of Wu such that further understanding of object parts may be obtained by providing a quantification of the data, in addition to allowing the Wu method to have a particular applicability to the field of medical imaging (see Holten-Lund et al. at section 1, paragraphs 3 and 4).

Regarding **claim 2**, Wu discloses a method wherein the step of applying additional geometrical information to the adapted deformable surface model of the object further comprises the steps of:

identifying surface elements of the deformable surface model relating to a particular sub-part of the object ("triangles belonging to the same physical part are obtained by a connected component labelling process" at page 42, line 12); and

fitting a geometrical primitive to the surface elements relating to the particular sub-part of the object in the deformable surface model, the geometrical primitive having a form corresponding to a form of the particular sub-part ("All parametric geon models are fitted to an object part by minimising a function of the difference between the shape and size of a part and the models" at page 61, line 9; figure 6.25).

Regarding **claim 3**, Holten-Lund et al. discloses a method wherein the geometrical properties of the object are extracted on the basis of the geometrical primitive ("To make the necessary measurements of the deformation we chose to approximate relevant parts of the femur-pelvis area with simple 3D primitives" at section 1, paragraph 4, line 1).

Regarding **claim 4**, Wu discloses a method wherein the surface elements of the particular sub-part of the object are identified by means of labels assigned to the surface elements belonging to the particular sub-part ("triangles belonging to the same physical part are obtained by a connected component labelling process" at page 42, line 12).

Regarding **claim 9**, the Wu and Holten-Lund et al. combination a computer-readable medium having processor-executable instructions thereon ("All programs were written in C or C++ and were run on SPARC-10 or SGI R4000 or R8000 workstations" Wu at page 81, line 7) for the image processing device above which, when executed by a processor, direct the processor to perform the method of claim 1 as described above.

### ***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATRINA FUJITA whose telephone number is

(571)270-1574. The examiner can normally be reached on M-Th 8-5:30pm, F 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katrina Fujita/  
Examiner, Art Unit 2624  
/Brian P. Werner/  
Supervisory Patent Examiner, Art Unit 2624